

What is claimed is:

1. A system for detecting an unauthorized movement of a communications/meter device, the system comprising:

at least one device attachment mechanism, having a selected attachment direction, that attaches a communications/meter device to a selected attachment site;

a magnetic field source, associated with the attachment mechanism, that provides a first magnetic field with a first field direction and a second magnetic field with a second field direction when the attachment mechanism is in a first selected position and in a second selected position, respectively;

a field-activated magnetic switch, positioned adjacent to the attachment mechanism and arranged so that, when the first magnetic field is applied to the switch, the switch is in a first switch state, and when the second magnetic field is applied to the switch, the switch is in a second switch state, distinct from the first switch state; and

a switch sensor, connected to and sensing the state of the switch, that generates a selected alarm signal when the switch is not in the first switch state.

2. The system of claim 1, further comprising a signal transmitter, associated with said communications device, that transmits a selected signal when said field-activated magnetic switch is not in said first switch state.

3. The system of claim 1, wherein said second position of said attachment mechanism is selected from the group of positions consisting of: (i) rotation of said attachment mechanism about said attachment direction by at least a selected threshold angle, and (ii) translation of said attachment mechanism in said attachment direction by at least a selected threshold distance.

4. The system of claim 1, wherein said attachment mechanism at said first position provides a magnetic field, projected in a selected sensing direction, with a projected field magnitude that is at least equal to a selected magnitude threshold.

5. The system of claim 1, wherein said attachment mechanism at said first position provides a magnetic field, projected in said selected sensing direction, with a projected field magnitude that is less than said selected magnitude threshold.

6. The system of claim 1, wherein said switch sensor comprises:
 at least one of an electrical current source and a voltage source, connected to said field-activated magnetic switch at a first selected location, that provides at least one of a current and a voltage at said switch, when said switch is in said first switch state; and
 at least one of an electrical current sensor and a voltage sensor, connected to said field-activated magnetic switch at a second selected location, that senses a first level of current or voltage when said switch is in said first switch state and senses a second level of current or voltage when said switch is in said second switch state.

sub. C1 67. The system of claim 1, wherein said magnetic field source is a permanent magnet having a selected magnetic field direction and including a magnetic material drawn from a group of materials consisting of aluminum-nickel-cobalt, iron-cobalt, iron-silicon, iron-samarium, permalloy and Mn-Zn ferrite.

7 8. The system of claim 1, wherein said magnetic field source is a permanent magnet having a selected direction that is oriented at a selected orientation angle relative to a selected switch direction associated with said switch, when said switch is in said first switch state.

8 p. The system of claim 1, wherein said field-activated magnetic switch is drawn from a group of switches consisting of a reed switch and a Hall effect switch.

9 10. The system of claim 1, wherein said field-activated magnetic switch has an activation direction for change of state of said switch, and at least one of said first magnetic field direction and said second magnetic field direction is chosen to be approximately perpendicular to a plane defined by said attachment direction and the switch activation direction.

10 11. The system of claim 1, wherein said attachment mechanism is drawn from a group consisting of a bolt, a screw and a friction-generating nail, and said attachment direction is chosen to be approximately a longitudinal direction of a shaft of the bolt, screw or nail.

12. A method for detecting an unauthorized movement of a communications/meter device, the method comprising the steps of:
providing at least one device attachment mechanism, having a selected attachment direction, that attaches a communications/meter device to a selected attachment site;

providing a magnetic field source, associated with the attachment mechanism, that provides a first magnetic field with a first field direction and a second magnetic field with a second field direction when the attachment mechanism is in a first selected position and in a second selected position, respectively;

positioning a field-activated magnetic switch adjacent to the attachment mechanism and arranged so that, when the first magnetic field is applied to the switch, the switch is in a first switch state, and when the second magnetic field is applied to the switch, the switch is in a second switch state, distinct from the first switch state; and

generating a selected alarm signal when the switch is not in the first switch state.

sub. C 12¹¹ 13. The method of claim 12, further comprising the step of transmitting said alarm signal when said field-activated magnetic switch is not in said first switch state.

13¹¹ 14. The method of claim 12, further comprising the step of selecting said second position of said attachment mechanism from the group of positions consisting of: (i) rotation of said attachment mechanism about said attachment direction by at least a selected threshold angle, and (ii) translation of said attachment mechanism in said attachment direction by at least a selected threshold distance.

14¹¹ 15. The method of claim 12, further comprising the step of selecting said magnetic field source to provide, at said field-activated magnetic switch, a magnetic field with a projected field magnitude that is at least equal to a selected magnitude threshold.

15¹¹ 16. The method of claim 12, further comprising the step of selecting said magnetic field source to provide, at said field-activated magnetic switch, a magnetic field with a projected field magnitude that is at least equal to a selected magnitude threshold.

17. The method of claim 12, further comprising the steps of:
providing at least one of an electrical current source and a voltage source, connected to said field-activated magnetic switch at a first selected location, that provides at least one of a current and a voltage at said switch, when said switch is in said first switch state; and

providing at least one of an electrical current sensor and a voltage sensor, connected to said field-activated magnetic switch at a second selected location, that senses a first level of current or voltage when said switch is in said first switch state and senses a second level of current or voltage when said switch is in said second switch state.

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16 18. The method of claim 12, further comprising the step of selecting said magnetic field source to be a permanent magnet having a selected magnetic field direction and including a magnetic material drawn from a group of materials consisting of aluminum-nickel-cobalt, iron-cobalt, iron-silicon, iron-samarium, permalloy and Mn-Zn ferrite.

17 19. The method of claim 12, further comprising the step of selecting said magnetic field source to be a permanent magnet having a selected direction that is oriented at a selected orientation angle relative to a selected switch direction associated with said field-activated magnetic switch, when said switch is in said first switch state.

18 20. The method of claim 12, further comprising the step of selecting said field-activated magnetic switch from a group of switches consisting of a reed switch and a Hall effect switch.

19 21. The method of claim 12, wherein said field-activated magnetic switch has an activation direction for change of state of said switch, further comprising the step of choosing at least one of said first magnetic field direction and said second magnetic field direction to be approximately perpendicular to a plane defined by said attachment direction and the switch activation direction.

20 22. The method of claim 12, further comprising the step of selecting said attachment mechanism from a group consisting of a bolt, a screw and a friction-generating nail, and said attachment direction is chosen to be approximately a longitudinal direction of a shaft of the bolt, screw or nail.

23. A system for detecting an unauthorized movement of a communications/meter device, the system comprising:

at least one device attachment mechanism, having a selected attachment direction, that attaches a communications/meter device to a selected attachment site, the attachment mechanism having a contact

portion at a selected location that rotates as the attachment mechanism rotates about its attachment direction;

a plunger, having a selected plunger movement direction, that is urged against the attachment mechanism contact portion and that moves along the plunger movement direction as the attachment mechanism rotates about its attachment direction; and

a plunger movement sensor that senses plunger movement along the plunger movement direction and that generates an alarm signal when the plunger movement is greater than a selected movement threshold.

24. The system of claim 23, wherein said attachment mechanism contact portion comprises a raised portion of said attachment mechanism whose transverse diameter increases as said attachment mechanism is rotated through a selected angular range about said attachment direction.

25. The system of claim 23, wherein said plunger movement threshold is selected to correspond to the group of attachment mechanism positions consisting of: (i) rotation of said attachment mechanism about said attachment direction by at least a selected threshold angle, and (ii) translation of said attachment mechanism in said attachment direction by at least a selected threshold distance.

26. The system of claim 23, further comprising a signal transmitter, associated with said communications device, that transmits a selected signal when said plunger movement is greater than said selected threshold..

27. The system of claim 23, wherein said attachment mechanism is drawn from a group consisting of a bolt, a screw and a friction-generating nail, and said attachment direction is chosen to be approximately a longitudinal direction of a shaft of the bolt, screw or nail.

28. A method for detecting an unauthorized movement of a communications/meter device, the method comprising the steps of:

providing at least one device attachment mechanism, having a selected attachment direction, that attaches a communications/meter device to a selected attachment site, the attachment mechanism having a contact portion at a selected location that rotates as the attachment mechanism rotates about its attachment direction;

positioning a plunger, having a selected plunger movement direction, that is urged against the attachment mechanism contact portion and that moves along the plunger movement direction as the attachment mechanism rotates about its attachment direction; and

providing a plunger movement sensor that senses plunger movement along the plunger movement direction and that generates an alarm signal when the plunger movement is greater than a selected movement threshold.

29. The method of claim 28, further comprising the step of selecting said attachment mechanism contact portion to include a raised portion of said attachment mechanism whose transverse diameter increases as said attachment mechanism is rotated through a selected angular range about said attachment direction.

30. The method of claim 28, further comprising the step of selecting said plunger movement threshold to correspond to the group of attachment mechanism positions consisting of: (i) rotation of said attachment mechanism about said attachment direction by at least a selected threshold angle, and (ii) translation of said attachment mechanism in said attachment direction by at least a selected threshold distance.

31. The method of claim 28, further comprising the step of transmitting a selected signal when said plunger movement is greater than said selected threshold..

attachment mechanism is translated in said attachment direction by at least a selected threshold distance.

36. The system of claim 33, further comprising a signal transmitter, associated with said communications device, that transmits a selected signal when said at least one of: said current is in said first selected range and said voltage is in said second selected range.

37. The system of claim 33, wherein said attachment mechanism is drawn from a group consisting of a bolt, a screw and a friction-generating nail, and said attachment direction is chosen to be approximately a longitudinal direction of a shaft of the bolt, screw or nail.

38. A method for detecting an unauthorized movement of a communications/meter device, the method comprising the steps of:

providing at least one device attachment mechanism, having a selected attachment direction, that attaches a communications/meter device to a selected attachment site, the attachment mechanism having a first sector and a second sector that are electrically conducting and non-conducting, respectively;

positioning an electrical circuit, including at least one of a source of current and a source of voltage, so that the circuit is electrically connected to the attachment mechanism at two spaced apart terminals, where the two terminals are both connected to the conducting sector when the attachment mechanism is in a selected first position, and at least one of the two terminals is connected to the non-conducting sector, when the attachment mechanism is in a second selected position; and

providing a sensor of at least one of current and voltage, connected to the circuit, that generates an alarm signal when at least one of the following conditions occurs: (1) the sensed current is in a first selected range and (2) the voltage is in a selected second range.

39. The method of claim 38, further comprising the step of arranging for said sensed current to be in said first selected range when (i) said attachment mechanism is rotated about said attachment direction by at least a selected threshold angle or (ii) said attachment mechanism is translated in said attachment direction by at least a selected threshold distance.

40. The method of claim 38, further comprising the step of arranging for said sensed voltage to be in said second selected range when (i) said attachment mechanism is rotated about said attachment direction by at least a selected threshold angle or (ii) said attachment mechanism is translated in said attachment direction by at least a selected threshold distance.

41. The method of claim 38, further comprising the step of transmitting a selected signal when said at least one of: said current is in said first selected range and said voltage is in said second selected range.

42. The method of claim 38, further comprising the step of drawing said attachment mechanism from a group consisting of a bolt, a screw and a friction-generating nail, and said attachment direction is chosen to be approximately a longitudinal direction of a shaft of the bolt, screw or nail.

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